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MAN IN HIS WORLD: BOOK I

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OMADIC JOURNEY

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MAN IN HIS WORLD

James Forrester—Co-ordinating Editor

NOMADIC JOURNEY

by

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MAN IN HIS WORLD SERIES

Nomadic Journey

Gifts of the Nile

Mexico Emerges

Eskimo—Journey Through Time

Grassland Safari

The Navigators

Indians of the Plains

China

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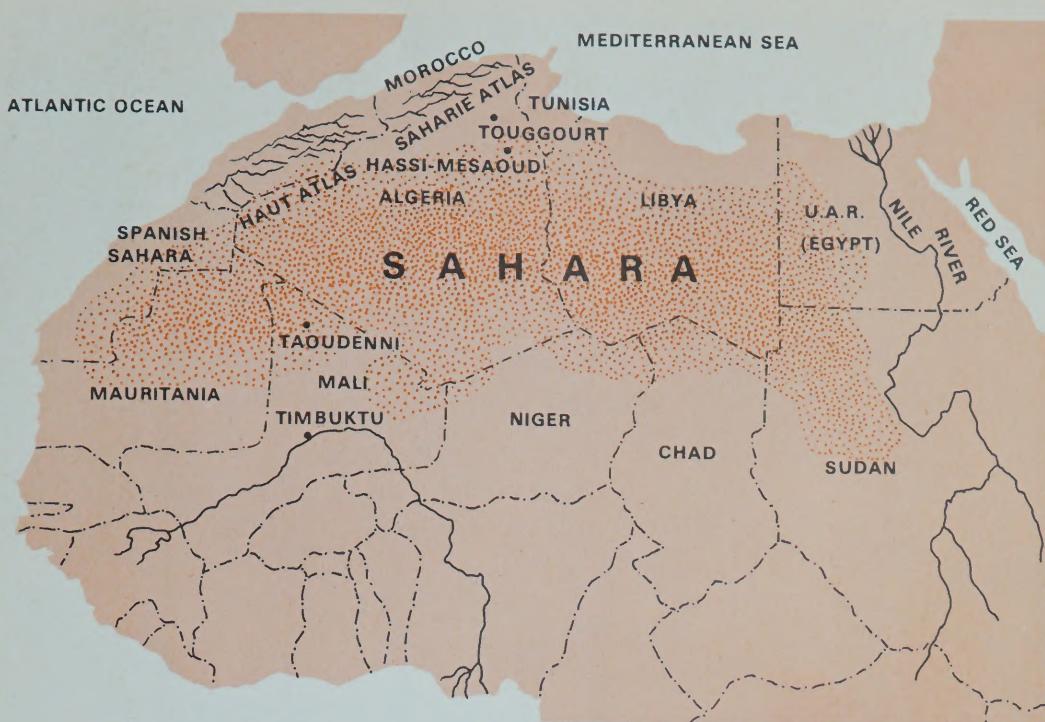


Deserts of the World

1. Use your atlas or wall map to find the names of the deserts shown above.
2. Which desert is the largest?
3. What continents and/or countries of the world are about the same size as this desert?
4. There are three million people living in the largest desert. Compare this number with the population of the other areas you have noted in your answer to question 3.

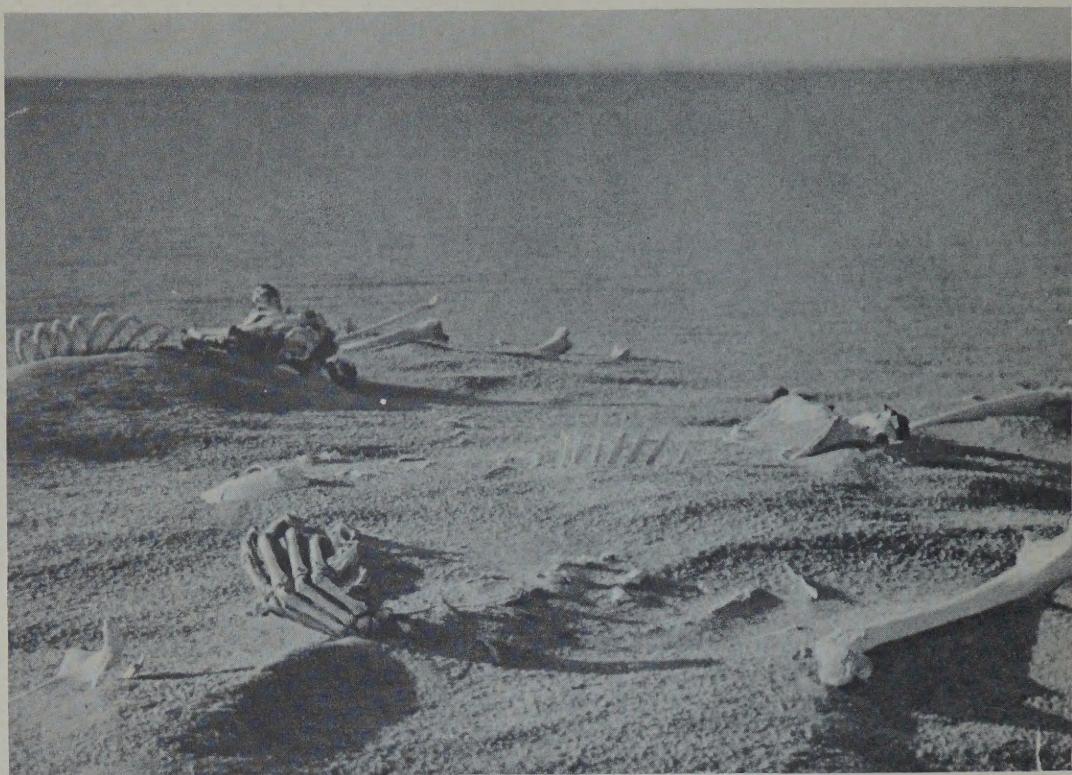
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Scenes from the Sahara Desert

1. Which picture on the opposite page is closest to your idea of a desert?
2. What differences can you see in each of these desert pictures?
3. Find out what fraction of the Sahara Desert is made up of sands.
4. From where do the desert sands come?



Tragedy in the desert.

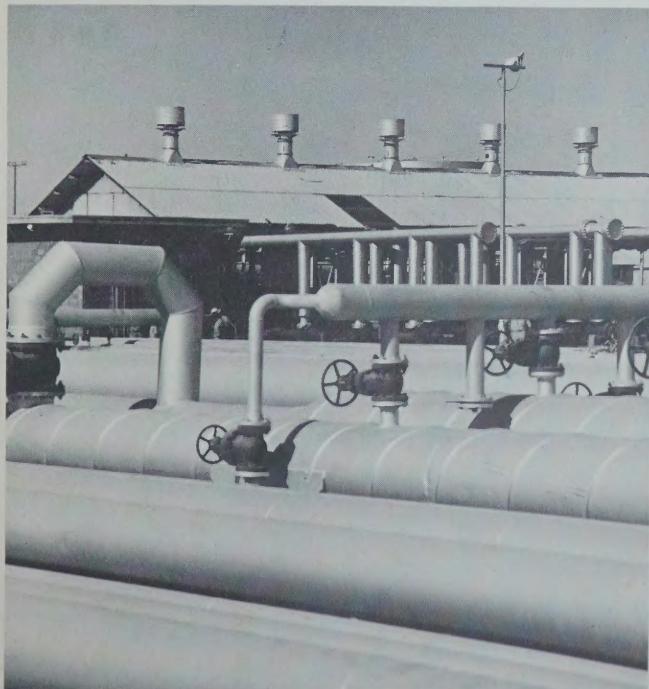
Station A	J	F	M	A	M	J	J	A	S	O	N	D
Temperature (°F)	56	59	63	68	75	80	84	83	74	67	62	58
Precipitation (ins)	2.1	2.7	3.0	3.8	4.5	5.5	6.1	6.0	5.1	4.3	3.1	2.4
Station B	J	F	M	A	M	J	J	A	S	O	N	D
Temperature (°F)	45	51	60	68	77	81	85	80	72	66	59	50
Precipitation (ins)	1.1	0.9	0.5	0.1	0	0	0	0	0.4	0.8	1.5	2.2

GEOLOGISTS MISSING

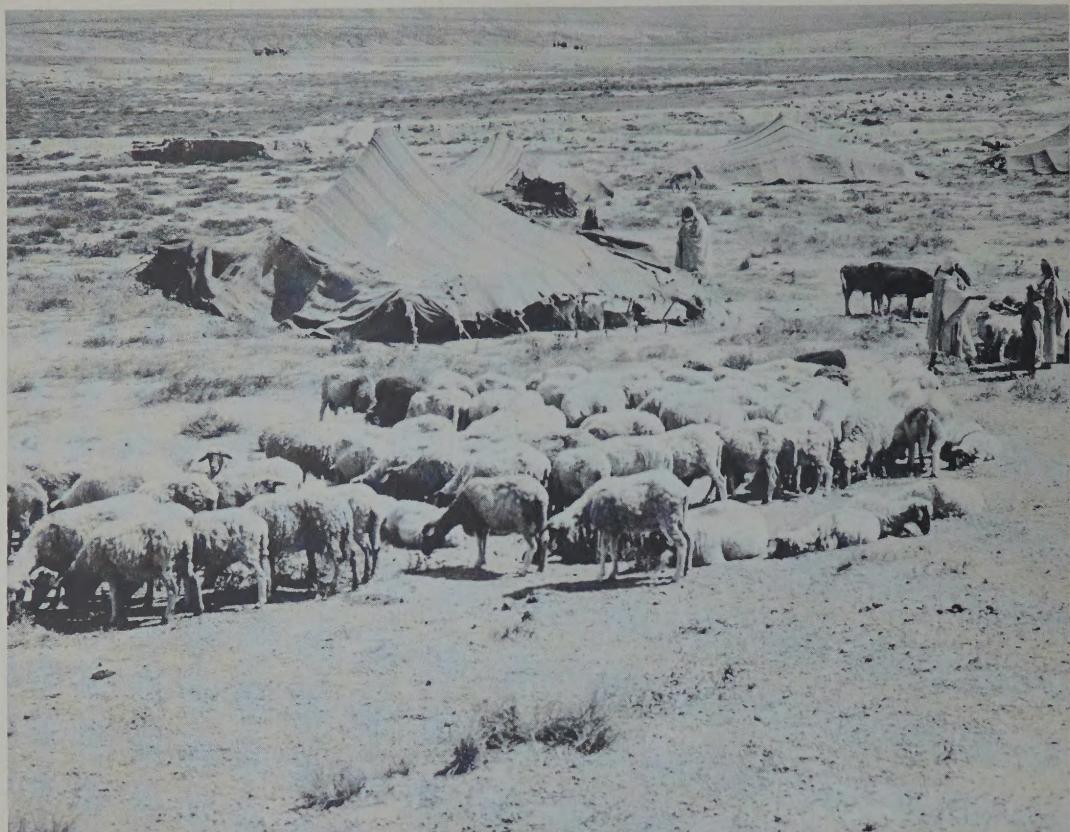
Read the story of the missing geologists.

1. Draw a picture or write a description of the land through which the men in the story are travelling.
2. Which set of climatic statistics on page 4 would you find in the area you have described in question 1?

Oil camp pump station.



Stumbling, sometimes dropping to their hands and knees, the two men stagger along. One thought is strongest in their minds — they want water and they can think of nothing but great jugs of cold water. The idea tortures them as they finally fall, weak from thirst and exhaustion, on the blistering desert. It has been hours since they have tasted water. Five days ago, they left the oil camp at Hassi Messaoud with enough supplies to spend several days surveying different areas of the desert where oil deposits were thought to exist. Having taken other trips of this kind in their two years with the oil company, and knowing the risks of **desert** travel, they thought they were well prepared when they set out. But three days later, the truck radiator exploded, stranding them in the desert. They remained with the jeep two days. However, when no help came, and their supplies were gone, they set out for the mountains which they could see in the distance. Now, the sun, high in the sky, is burning them up. It will continue to do so for several hours. If they do not get



Nomad encampment.

The boy on the opposite page, whose name is Hamid, lives in a place like this.

Tell from the picture above what his people do for a living.

Does Hamid's land seem a good place to do this? Why? Why can't Hamid and his family stay in the same place all their lives? Soon they must leave this place and wander out over the desert land to search for food for the animals. People who move from place to place are called **nomads**.



Hamid.

Did You Know?

... Tripoli in North Africa holds the record for high temperature with a reading of 136.4°F.

... In the Australian desert the thermometer may record 100° or more for 64 days in a row!

Did You Know?

... The fat tail of the desert sheep is used for the same purpose as is the hump of the camel!

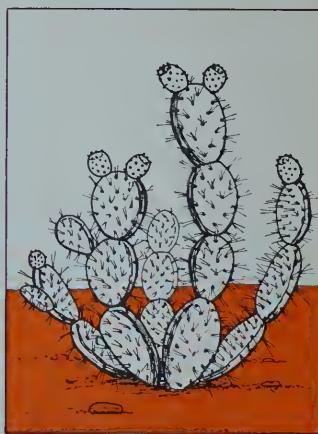
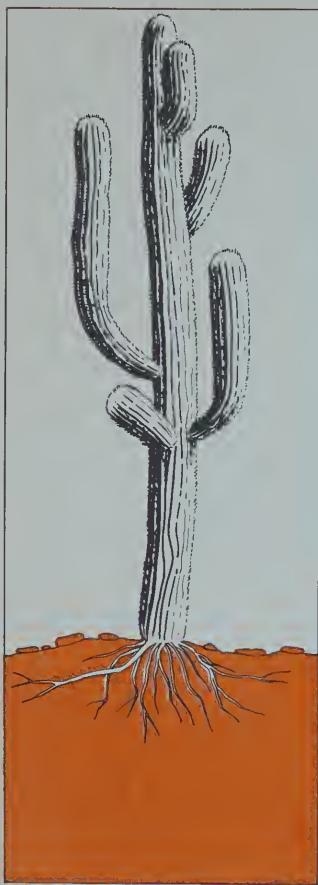
something to drink, they will die, and they know this will be a horrible death.

HAMID SEES THE VULTURES

Far off above the horizon, the waves of heat dance over the burning land. This barren land of heat, sand, stone and wind is my home. My name is Hamid. Last week I had my tenth birthday. As the only son of Abdullah and Halima el Fassi, I help with the work of tending our flocks. This is usually done by the older boys of our tribe. The animals must be moved from one grassy area to the next. My father told me to watch the sheep carefully. Often tempted by some small patches of tasty grass, the sheep will wander out of sight. It may take me hours to find them again.

Checking for stray sheep, I look out over the desert. In the distance, vultures are circling above the burning sands. They are great black birds with wicked claws who feed on the dead bodies of animals and men. I shield my eyes, but the blazing rays of the sun cut through the small cracks

How Plants Have Adapted to the Desert



If a plant is to survive on the desert it must be able to overcome the problem of lack of water.

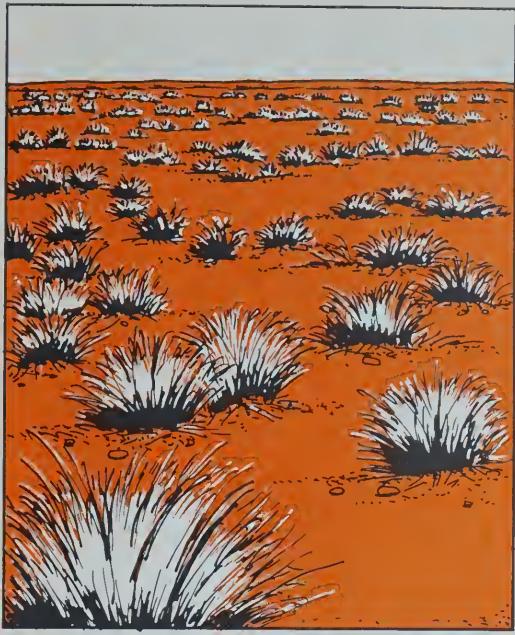
Examine the sketches above.

How do these plants obtain enough water to grow?

Try to discover other ways that plants develop so that they can live on the desert.

Having obtained water, how do the plants hold the moisture for use during the dry seasons?

How do many plants protect themselves against the animals who want their moisture?



Things To Do

Take some beans. Place a damp paper towel around the inside of a glass jar. Place the beans between the towel and the jar. Keep the towel damp by sprinkling water on it each day. Observe how the dormant beans begin to sprout to life and develop roots.

Did You Know?

- ... Roots of the desert mesquite plant may extend as deep as 65 feet and alfalfa roots have been found 129 feet below the surface.
- ... The seeds of certain desert plants can lie sleeping for years until there is a cloud-burst of sufficient rainfall, and then they will quickly **germinate**.

Did You Know?

- ... In 1969 Arizona was plagued with "cactus rustlers!" The cacti were being stolen and sold in the cities for landscaping! What tragic effect could this have on the desert?

between my fingers. Moving closer, I can see the vultures swooping about the limp bodies of two men. I run and find them alive but gasping for water. Leaving my waterbag with them, I race home for help. My father exclaims, "The missing geologists!"

We hurry to the rescue and get there just before the vultures attack. We take the men back to camp where my people care for them for three days. We have saved their lives.

Then my father loans them two camels and gives them supplies for the trip back to the oil camp at Hassi Messaoud. After thanking us and vowing to see us again, they set out across the desert once more.



Wind and water erosion carved this stone statue.

Pedestal Rock

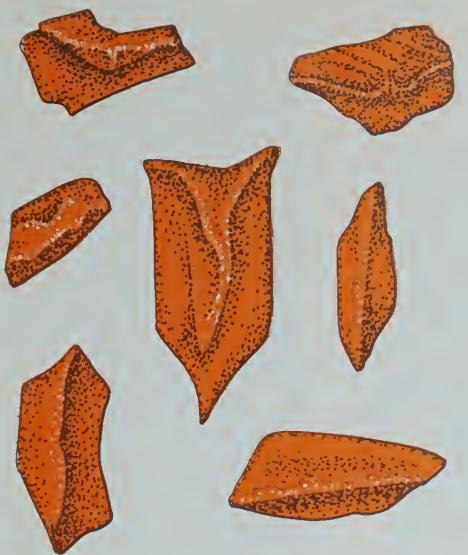
This is a rock like the one Hamid saw as he gazed out over the desert.

Of what does it remind you?

Why is this rock so small at the base?

Why is the top of the rock not so badly worn as the bottom?

What will eventually happen to the rock?



Sand particles.

Things To Do

On a windy day, scatter a pail of sand over the ground. Observe how high the majority of particles lift off the ground.

Did You Know?

... Sand particles have very sharp cutting edges, sometimes 1, 2 or 3.

Did You Know?

... Even in the strongest wind storm sand granules are rarely lifted more than four feet off the ground.

DESERT SCENERY

It has been two months since the geologists returned to Hassi Messaoud.

Another summer has passed on these grassy plains known as **steppes** which border the desert. Each warm season, we bring our flocks to graze on the tall, lush grasses. There are few tall trees in this region of the desert because of the lack of rainfall.

However, scattered about, are small clumps of bushes and tiny plants. Some bushes seem to have no leaves at all, or just little thorny ones which help to prevent the plants from losing much water. Few flowers are seen during the dry seasons; but, after a sudden downpour, the desert may become a colourful carpet. As if by magic, the bushes appear like a rainbow of flowers.

Towards sunset, the blazing heat of the afternoon is replaced by cool, refreshing breezes. Twilight is the most beautiful time on the desert. Far off to the west, large stones and boulders stand black against the orange sky. They remind me of desert spirits rising into the night. "Ay-y-y! What has touched my foot?" I look quickly to see if it is a scorpion whose

Desert Animals

Suggest things about these creatures which help them to live on a desert.



Tortoise.

Kangaroo Rat.



Scorpion.



Horned Lizard.



Sidewinder.

The Kangaroo Rat

Here is a list of facts about the kangaroo rat. Rearrange this list into the order which you think is most important in assisting this animal to survive on the desert.

Tell why you arranged your order as you did.

They have strong hind legs and can make enormous leaps.

Their long tails act like airplane rudders so they can turn in mid flight.

They conserve water by staying underground during the day.

They search for food at night.

They do not sweat.

They never drink water.

They can change the starches of dry food into all the moisture they need.

sting means death to its prey. No, it is only a horned lizard trying to escape the blazing sun of day.

I will catch him and take him home to scare my sister Sarah. But the little lizard is too hard to catch. When he is not moving, his brown, black and white colouring blends with the ground.

When chased, this crafty animal burrows deep into the sand. I am sure I walked past the mischievous lizard several times, but in the sand he is invisible. Perhaps if I listen closely, I can hear him laughing at me.

Did You Know?

... The large animals of the desert survive because they have the speed to reach water holes and to take advantage of the pastures that develop after rains.

... It was man's attempt to pursue these animals that gave rise to the use of motor vehicles in desert areas.

Did You Know?

... The kangaroo rat never drinks water but lives on hard dry seeds. His body is able to combine oxygen from the air and hydrogen from the seeds to produce all the water he needs!

Did You Know?

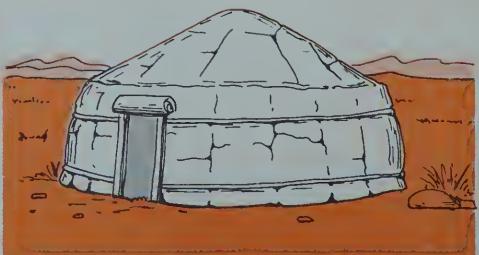
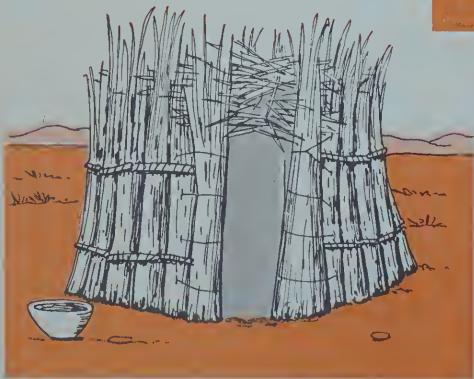
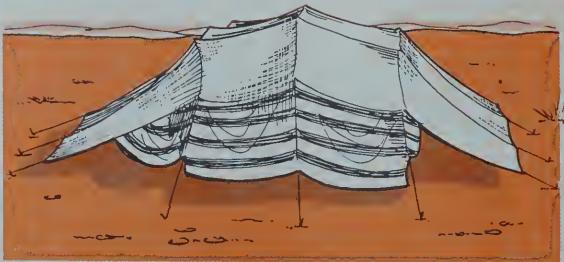
... The fur, wool or hair helps to insulate the animal from high air temperatures and reduces loss of water from the body.

Did You Know?

... Some scientists believe that the eggs of shrimps can survive for 100 years buried in mud and then suddenly hatch when they are covered with water from a storm.



Hamid's summer playground.



Which of these pictures is: a Pueblo? a Navajo hogan? a Bedouin tent?
a Tuareg zeriba? a Mongol yurt?

Desert Homes

Hamid and his family make their home from the things they can gather from the land. Study the sketch which shows the land in which they live from May to September.

What do you see that could be used to build this home?

On the opposite page are sketches of several homes used by people who inhabit hot lands. Which home do you think could be Hamid's? Write a sentence which tells why you think this is Hamid's home.

Look on page 16 and you will see a picture of Hamid's home.

Were you right?

The grass where Hamid lives in summer grows very tall.

He is standing beside the tall grass in the sketch.

How high does it grow?

Look carefully at the picture of Hamid's house again. It is 15 feet square and 10 feet high. It is built of grass laid over a wooden frame. Could you get Hamid's house into your classroom?

If your classroom is large enough, you might mark the floor and wall with chalk so that you could pretend to sit inside Hamid's house. Do you think it would be easy to make a house like this? Write down in the order you would do them all the things you would do to build this house.

OUR HOUSE

We live in a cool zeriba in the summertime during the hot spells.

In winter we live in a tent made of woven wool strips or leather that is dyed red. My father tells me the Arabs have a proverb, "As you take someone into your tent he is your guest, therefore he is holy." But even inside our house, my father never takes off his **litham**, the blue veil which is always wrapped around his head and face. No Tuareg ever shows his nose or mouth to a stranger for fear an evil spirit might enter. When my father eats, he holds the veil out with his left hand. My father also wears a leather pouch full of charms and quotations from the Koran.



Zeribas are sometimes made from palm leaves. Little boys have haircuts that look like cockscombs. Arabs believe that Allah the Prophet pulls the child up to heaven by it if he dies.

Things To Do

Bring some straws to school and gather some of that tall grass. Try to build a miniature model home like Hamid's.

Did You Know?

... The male members of the Tuareg tribe of the Sahara always wear a blue veil to cover their face even when they sleep and eat. They say if a Tuareg falls in battle and his veil is lost his friends must put a veil on his face before they recognize him. He looks like a complete stranger to them without his veil!

Hamid's father, Abdullah, belongs to the Tuareg tribe. Tuaregs are white-skinned and noted for their good looks and the speed at which they ride their camels. →

Hamid's father has to spend much of his time on the desert. He has learned how to dress to protect himself against the desert climate. Here is a list of things.

Tell why each article might or might not be useful as desert wear.

desert boots	business suit	gloves
veil	sunglasses	blanket
umbrella	Bermuda shorts	
overcoat	necktie	
turban	suntan lotion	
sandals	bathing suit	
robe	hat	

How is he protected from the glare of the sun?

How are his nose, mouth and eyes sheltered from blowing sand?

How does his clothing help to keep him cool even in the worst heat?

How does his clothing keep him warm when the chilly night winds blow?

WE PREPARE FOR A JOURNEY

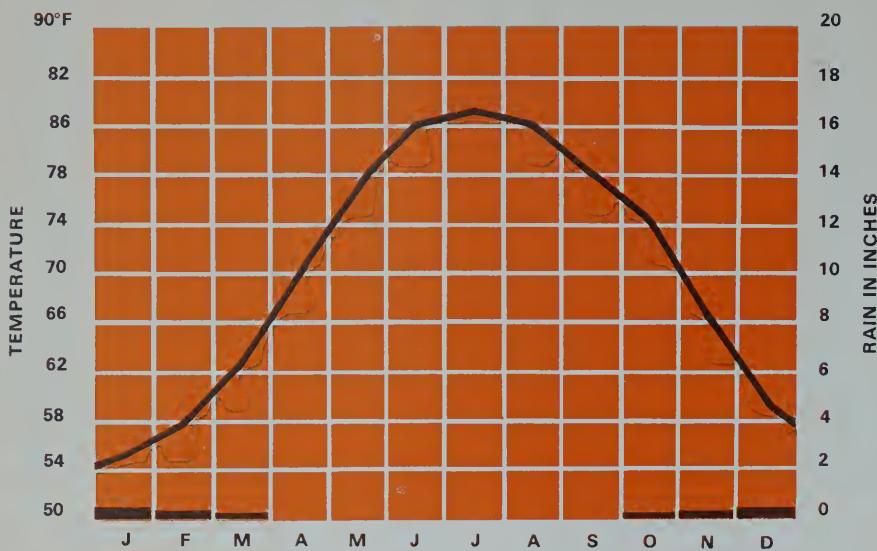
When I return to the camp, Father says, "Tomorrow we will be moving to the winter grazing area in the desert." These large desert pastures near the **oases** have been used by my people for hundreds of years.

Mother and my sister Sarah, who is eight years old, are already beginning to gather the things we will need for the trip. Sarah has been busy milking the goats, while Mother has finished weaving the piles of goat hair into material.

As the first rays of sun appear, the camp comes alive with activity. It is moving day for our tribe. We belong to the Tuareg tribe, the "People of the Veil." With the other men, Father has already prepared the camels for the long trip. They will carry our belongings for many days across the hot desert. The legs of the camels were bound together during the night to prevent them from wandering away. There are times, however, when these sly beasts manage to slip away unnoticed and travel



Desert Climate



This is a climate graph of the desert land through which Hamid will be passing.

If you can read this graph, you will know a lot about a desert.

Which months are the warmest on this desert?

How much rainfall does the desert receive?

Which season receives the most rainfall?

Which month in that season receives the most rainfall?

If you had to live on the desert for a month, which month would you choose? Why?

What season would be best for Hamid and his family to cross the desert? Why?

This table tells us a lot about a desert too. How is it different from the climate graph on the opposite page? Using the information, make a graph showing the daily temperature range.

Date July 12	Time	Temperature	Time	Temperature
	Noon	105 F°	Midnight	80 F°
	1 p.m.	107	1 a.m.	77
	2 p.m.	110	2 a.m.	74
	3 p.m.	112	3 a.m.	72
	4 p.m.	113	4 a.m.	71
	5 p.m.	110	5 a.m.	74
	6 p.m.	104	6 a.m.	76
	7 p.m.	102	7 a.m.	80
	8 p.m.	98	8 a.m.	84
	9 p.m.	91	9 a.m.	91
	10 p.m.	87	10 a.m.	97
	11 p.m.	82	11 a.m.	102

miles from the camp, even with their legs tied. Hours and sometimes days are needed to find them and lead them back to camp. Sarah is busily helping Mother gather together the household goods. The women do most of the work of moving and loading the camels. First, the camel kneels and a wooden or leather saddle is put on its back. Then Mother and Sarah must carefully load our things. "Sarah, fill the water bags!" calls Mother. Sarah is so interested watching others work, that she forgets to do her own jobs. Quickly she runs to the **shaduf** to fill carefully each skin bag. Water is too precious to spill even a drop. "Come Hamid!" shouts Father. "It is time to round up the animals."

How warm did it get on July 12? At what time was it warmest?

How cold did it get on July 12? At what time was it coldest?

The difference between the warmest temperature and the coldest temperature on any day is called the **daily range**. What was the range in temperature on July 12?

If you visited the desert on that day, would it be hard to decide what to wear? What would you wear? Why?



If you have ever moved you know what a big job it is to get all your things packed and ready for moving day. Think what it must be like for the nomads who have to move many times as they look for new feeding grounds for their animals. What things would your mother let you take with you if you had to move every day? Limit yourself to your ten most important things. Your mother and father would be very careful about what they took also. Would they take their stove, television, piano?

Remember that when Hamid's family move they depend upon their camels to carry their goods.

"DEATH WALKS WITH US"



Suggest some things that they might take. Your list must not include anything which is big and bulky. Your list must include only the things which you think would be most important to these people. Limit your list to twenty things. Write all things you have suggested on the blackboard and have other members of the class add the things from their lists which you have not included. See which things everyone in the class thought were the most important. How many camels would you need to move all the things on your list? Did any suggest moving the house?

At last, everything is ready for the long voyage across the desert. We have taken this journey many times, but each time the excitement grows. My father once told me a story of a small caravan crossing the desert. Suddenly drums were heard. Filled with terror, the men froze and strained to find the cause of this strange sound. The throbbing became louder, then softer. At times it seemed far off; at times close by. One of the men cried out, "Death walks with us!" As he spoke, another man, his face white with fear, swayed in his saddle and slipped from his camel, thudding heavily against the ground. Leaping from their camels, the men of the caravan rushed to help their friend, but in vain. He was dead! The throbbing beat those men heard was caused by powerful gusts of wind striking the sand dunes. This pounding sound against the dunes is like the sound of the giant breakers as they smash against the cliffs at the seashore.



The baby camel hitch-hikes on moving day.

The camel is one of the most difficult animals to mount. Read these instructions carefully so that you may play act the camel mounting process. Pay attention to what both the camel and the rider might do.

The Animal is **barraked** (all four legs are folded so that the knees point forward) for mounting. When you mount, step on the camel's knee with your left foot.

Swing your right leg over the back of the saddle. Put your right foot on the camel's neck.

The camel gets up like a cow, back end first. Be careful that his rising stern does not toss you over his head when the front end comes up; be careful that you are not thrown too hard against the back of the saddle.

When the camel straightens up you will be eight feet above the ground.

Move your foot against his neck and he will amble off at a slow walk.

As the camel moves you will sway gently back and forth.

If the camel does not like the way you ride, he might drop quickly to his front knees.

Usually the unprepared rider will sail over the animal's head in a sudden tumble.

Slaves loading bags of salt on to camels. →

A Tuareg camel saddle. →

Did You Know?

... The value of a camel in 1910 was 20 milk cows. The value of a camel in 1969 was 1 cow.

Did You Know?

... Most camels are slow and travel only 20 miles a day. Some camels are trained to run and may cover 40 miles a day.

MOVING DAY

The cry goes out among the people. "It is time to leave." Sarah rushes over to the camels. This is the part of the trip she loves best. The young girls ride on top of the bundles. Sometimes, young camels also ride on top of their mothers. Just as your father's car runs on gasoline, the camel gets its energy from the fatty tissue stored in the hump. When the fatty tissue in the hump is gone, the camel stops; just as when the car's gas tank is empty, the car stops!

When all is ready, the leader whacks his kneeling camel with a stick. It staggers to its feet, then, one after another, the other camels follow. The leaders of the tribe ride ahead. Some of the people walk, while others ride the camels. I join the men and boys to drive the herds of goats and flocks of sheep. Glancing back, we take one last look at our summer home as we move towards the hot sandy desert.





"The Ship of the Desert."

The Camel

The camel is often ill-tempered, uncomfortable to ride and slower than some other animals, yet he has been named the "Ship of the Desert."

Here are some specific features about the camel. How does each feature make him well suited for desert life?

The camel can go several days without food or water.

The camel's lips and tongue are very tough.

The hump of the camel contains nourishment stored as fat.

Body tissue of the camel contains large amounts of fluid.

The camel's feet rest on broad, soft pads.

His nostrils and eyelids close very tightly.

SUDDEN DEATH

We have been travelling for days on the hard stony ground towards the sand desert. In some parts of the world, it is easy to travel comfortably in a car for hundreds of miles on paved highways, but it is very different on the desert. We can move only as fast as our animals. Here and there are small patches of salt bush which the flocks will eat and we must stop and let the hungry animals feed. Ahead lies a **wadi**. I ask my Father why we do not go along this gully, since the travelling would be easier and more direct. There are grasses and small shrubs in the wadi for the animals to eat. My father studies the sky ahead and answers, "I don't think we should." Soon, the clear sky becomes cloudy and dark. Streaks of lightning flash across the sky. Thunder roars and the sky opens up in a downpour of pelting rain. Some sections of the desert become fast-flowing streams which empty into the low-lying gully. The wadi quickly turns into a rush of mud and water. It sweeps away everything in its path. A few of the sheep have wandered into the gully to feed on the clumps of grass along the

Did You Know?

... A camel was kept without water for 10 days and lost 220 lbs. When the animal was allowed to drink, in ten minutes it drank 27 gallons of water which weighed 220 lbs.!

Did You Know?

... A camel consumes 40-70 lbs. of fodder a day. How would this affect the route and number of camels on a caravan?

Did You Know?

... A camel may lose as much as 30% of its body weight due to lack of water and it will still survive. If a man loses between 10-12% of his body weight due to lack of moisture he will die!

Did You Know?

... At one time 15,000 camels were in use on the caravan route from Timbuktu to Taoudenni. The trip took 30 days. Today trucks make this same journey in 4 days. Question: Why do you think the trucks are used in place of camels, even though transportation by truck is three times as expensive as by camel?

Did You Know?

... A story has been told of caravans lost under the blazing sun. They search out a water hole but find each one a dry patch of crusted ground. The men's lips become cracked and bloody; their tongues begin to swell and choke them. To stay alive, the men kill a camel and slash into the stomach to get the greenish slimy liquid for drinking. Even though the idea of doing such a thing is sickening to us, at times men will do almost anything to stay alive.

Finding Water Holes



X -- Market town.

Y — Original camp.

We are heading across the desert to sell our sheep and goats at the market. Refer to the legend to find the original camp and the market town on the sketch map. It is 400 miles across the desert to the market town. How many inches does this distance measure on your map? How many miles would each inch represent? If you can answer that question you know the **scale** of the map.

How far is it from your house to your school?
How long does it take you to walk to school?
At that rate how fast would you walk in an hour?
How long would it take you to walk across this desert?
Why would the nomads not be able to cross the desert in a straight line?

Compare the movement of sheep and goats and their walking while grazing? How far (in a straight line) might they travel each day? What else would the flock and herds need beside grass to stay alive?

Study the sketch map and plot the route you would take to get the herds across the desert. You may not move from one water hole to another if they are more than 50 miles apart on the sketch map. Assuming that it takes 2 days to travel from one water hole to the next, how long will the trip you have plotted take? What is the shortest possible route you can plan using this sketch map? Why do you think there are huge areas without any wells? Explain (in miles) what is meant by the term **huge** in the previous question?

Hamid's family cannot take their large "zeriba" with them.

- What kind of home must they take?
- Why would a portable home be a good type of home for the nomads?
- Perhaps on your vacation you have lived in a portable home.
- Tell us about it.
- Hamid's family uses tents. Sarah and her mother made the family tent themselves.
- From what might they make it?

edges. Within minutes, they are drowned. Some have tried to climb the steep sides, but their attempts are in vain also. I shudder to think that I would have met the same fate as those helpless animals if I had travelled through the wadi myself. As quickly as the storm has come, it disappears. The clouds part and the sky is once again clear.

A SALT CARAVAN

The following day, we see a salt caravan crossing the desert. Even though the clothing of my people helps to protect them from the blistering heat of the desert, much of the salt in the body is lost through the heavy flow of perspiration. To keep healthy, this salt must be replaced. For this reason, salt is a very important mineral.

In the farm lands of Canada, large blocks of salt called "salt licks" are put in the fields for the animals. In North Africa, large blocks of salt are brought to the desert regions by camel caravan, from the salt mines at Taoudenni and Lake Chad. Salt licks for the people are used in much the same way Canadians use them in rural areas for their cattle.



A salt caravan.

Things To Do

On a hot day or when you have exercised and are sweating, taste the sweat from your arm. What does the sweat taste like?

Things To Do

Make a model of:

- (a) A nomad's tent.
- (b) Your home.

Many long hours are spent weaving strips which are then sewn together.

Draw a nomad tent. Remember:

1. It is held up with poles (think how).
2. It is built low to the ground (think why).
3. The sides can be raised and lowered (think when and why).
4. It is fastened to the ground at the back (think why).
5. It is divided into two rooms (think why).
6. There are mats and rugs instead of a floor (think why).
7. There is no place to cook in the tent (think why).
8. In the tent are wooden and copper bowls (think where).

Erecting the framework of a tent.

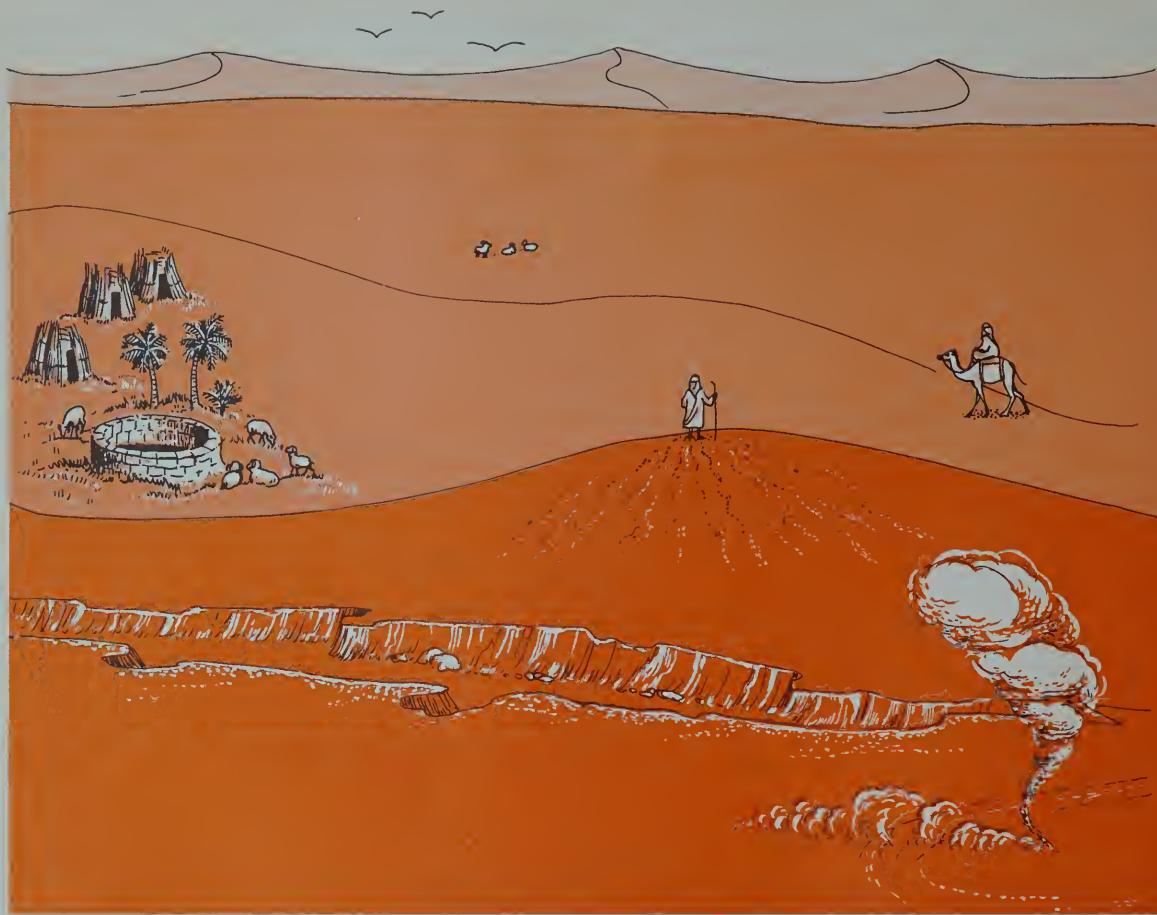


SMOKING DUNES

Several hours later, we have our first real look at the sandy desert. It is not always flat. You are surprised to find that there are large hills of sand. Some are called **ergs**, others **barchans**. These hills can at times be up to 1,000 feet in height, but because the sand is so loose, it is difficult to climb them. It is best to travel between these hills in the narrow lanes where the blowing winds have kept it clear. Sometimes, the high winds of the desert blow the particles of sand away from the tops of these sand hills. It looks as if the hills are smoldering with fire when this smoking sand drifts from the tips of each ridge. The wind constantly changes the position of the **barchans**. For this reason, no maps of the desert can be really accurate.

Some men of the tribe are sent out to find water before we move on.

"Come quickly!" I call to Sarah. "Father is coming." Tired and thirsty, Abdullah arrives. For several hours he has been searching for water holes and pasture. Father's face tells us the news before he begins to



The tent is ready.





Both people and animals often drink from the same desert water holes.



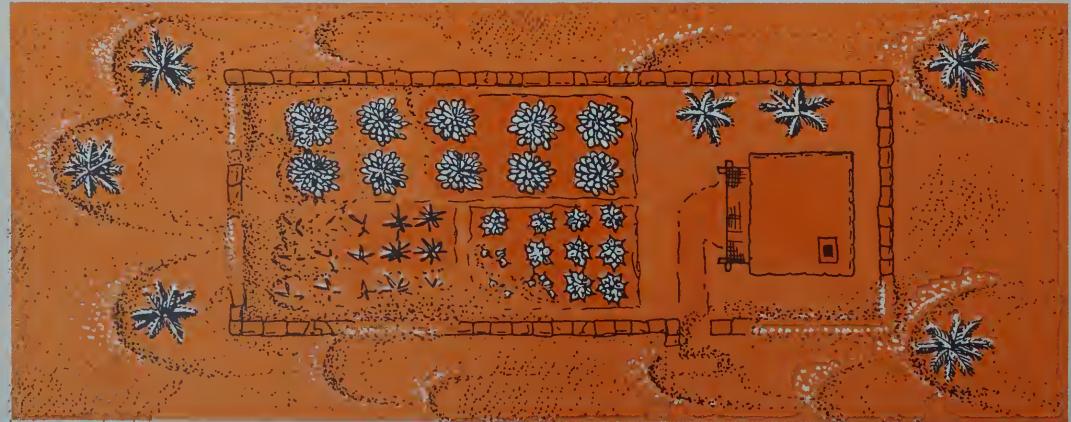
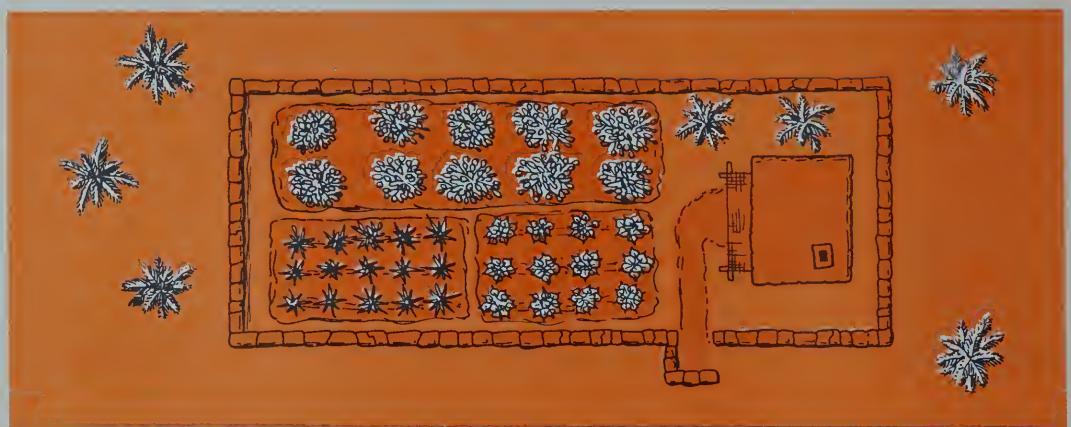
speak. "The ground is dry and hard." It may be days before we reach the next water hole." We nomads often travel several hours or sometimes days before finding new pasture to feed our animals. The hungry flocks will wander from one tuft of grass to another, taking greedy mouthfuls as they move. Regions which have much rainfall may appear like carpets of green, but the desert is rarely like this. We make our camp, if possible, in a place where there are some grasses. When the flocks have eaten all the grass around our camp, we will move on through the desert, in search of new feeding grounds. We have been travelling on the desert for twenty-five days. At times, we have had to use the extra water we carry, because of dried-up water holes. Will our water hold out?

DESERTED ISLAND IN A SEA OF SAND

Far off on the horizon, the tips of palm trees are seen. At last we will reach the oasis! Moving closer, I am disappointed to see that there doesn't seem to be any life at the oasis. "Father,



A desert sandstorm obscures an exploration camp.



Why are the winds and desert sands an enemy to the oasis farmer?



Why are the winds and desert sands an enemy to the oasis farmer?



Why are the winds and desert sands an enemy to the oasis farmer?

why are there no people here?" "This oasis is no longer used, son. The winds have blown the sands across this region. Look at the palm trees. Some of them are covered with sand; others are bare. Notice how the roots show above the ground. Many of the trees are dead, buried under mountains of sand or killed because of lack of water to the roots. The small sand-brick homes are crumbling under the weight of sand which has built up on the roofs." "Why are there no grasses or crops growing?" I ask. "Many years ago," he answers, "the locusts swarmed over this region. Like a deadly blanket, they covered and ate all living plants and left only short stubs of grass and roots where once grew luscious crops of vegetables and fruits. The people of the oasis had to move on to a new area to build their homes again."

DARKNESS AT MIDDAY

From this dying village, we again push out into the parched land. Two days later, I learn what Father meant when he once said, "The greatest danger is the



A fertile oasis with gardens and palm trees.



Sketch map of oasis.

Did You Know?

... Locusts move downwind and are strictly controlled by the moisture and rainfall of a region. Locusts feed on green vegetation.

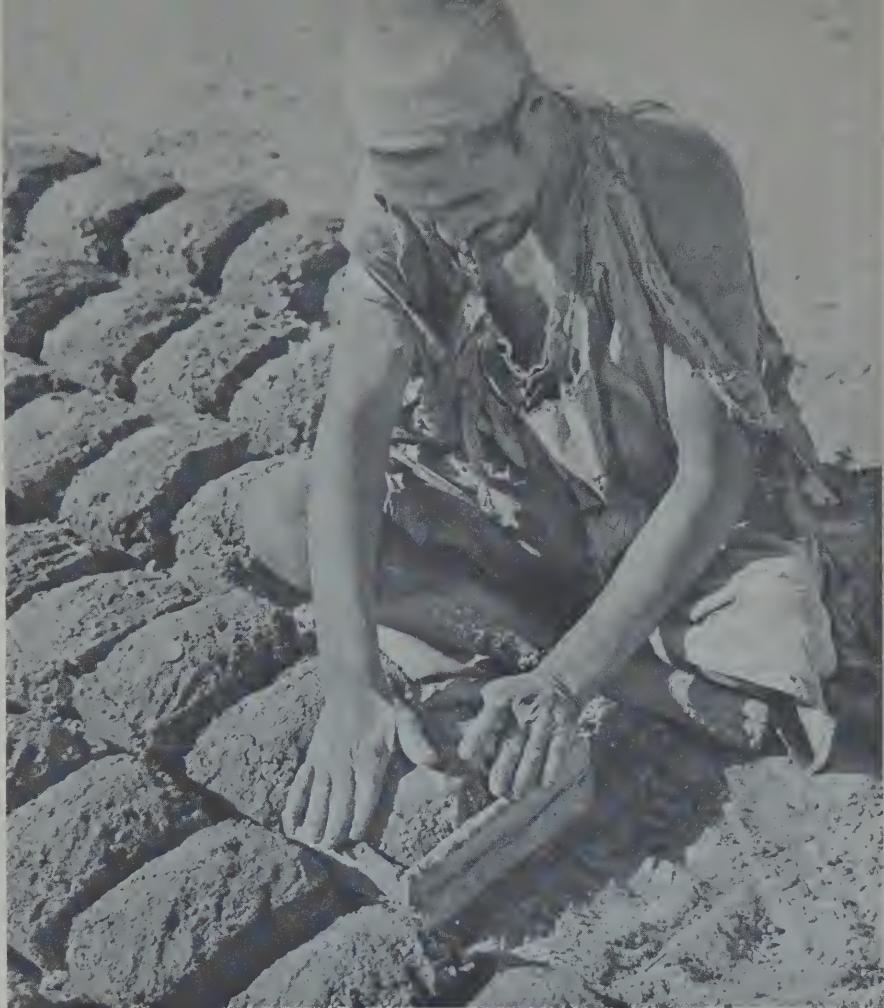
Life of the Oasis Dweller

Look carefully at the sketch map of the oasis and the picture taken of the oasis (the picture shows only one part of the oasis).

1. Compare what is shown in the picture with the symbols on the sketch map that represent the same things.
2. From what point on the sketch map is this picture taken? How do you know the picture was taken from the point you have chosen?
3. On the sketch map find the symbols that are used to show the following:
 - (a) the homes of the oasis people
 - (b) the roads
 - (c) the trees
 - (d) the area where the people grow their food
 - (e) the wells where the people get their water
 - (f) the modern swimming pool
4. Why is there a modern swimming pool in the oasis?
What people would use the swimming pool?
Who would pay for the building of such an expensive pool?
5. What links do the oasis people have with the other oases of the desert? What links might the people have with other places that are not shown on the sketch map?

desert storm." In most countries, a storm is usually a rain or wind storm. In the distance, the calm scene becomes a raging movement of sand. The dunes appear to be on fire. The whole horizon is shifting and moving, the sun blotted out by a sea of brown. "Save us, Allah!" a man screams. In an instant we jump to the ground. The camels, sensing the storm, have knelt, their backs facing the onrushing winds. "Sarah, crouch behind the camel. Cover your head with this blanket." The sky is growing dark as I hear the sound of the raging winds.

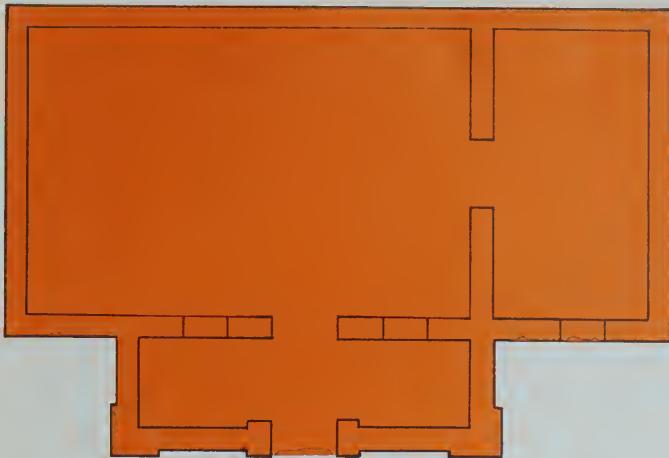
Suddenly the sand storm hits us! Huddled behind the camel for protection, we can still feel the power of the driving sands. Like little needles, it beats down against our bodies. There is nothing to do but lie still and wait until the storm passes. I can feel sand piling on top of me, and the only thing I can think of is how many caravans are buried alive under the sandy dunes! Within half an hour, the storm has passed. We are covered by three or four inches of sand. "Is everyone all right?" our chief calls. No injuries are reported so



A worker makes bricks.



The bricks are dried in
the sun.



Floor plan of the home of the oasis people.

Oasis Houses

Compare the floor plan of the house with the picture of the house on the opposite page.

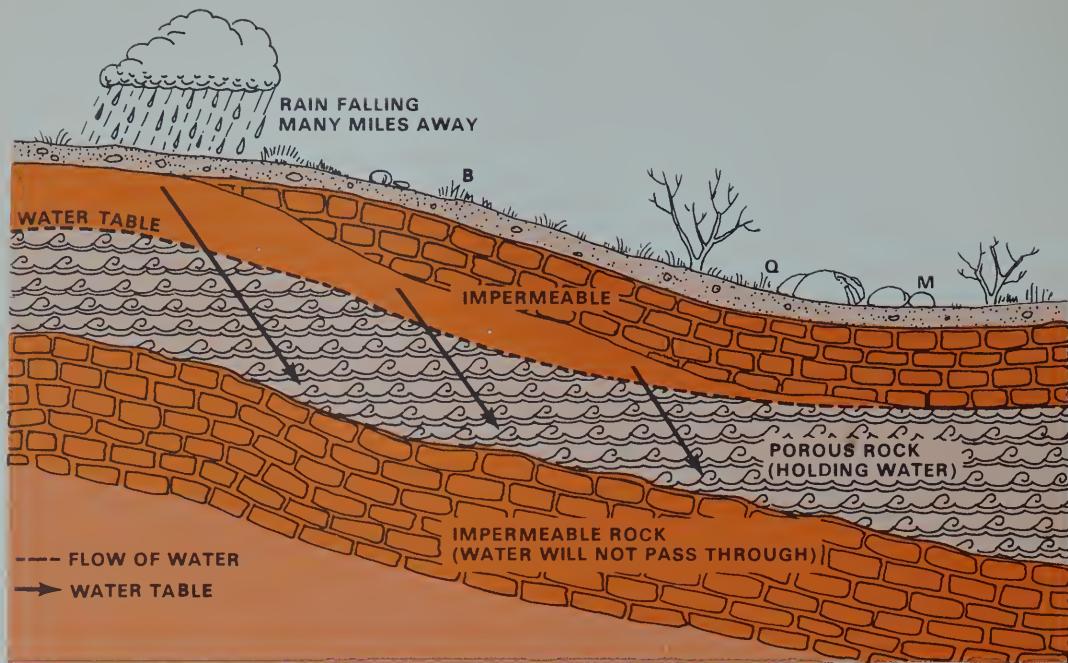
1. How have the houses of the Tuareg people changed from those they live in
 - (a) on the desert?
 - (b) in the grasslands?
2. What materials have they used to make their oasis homes?
3. What other differences can you find between the oasis home and those homes on the desert?
4. How would you divide the house into different areas? What would you use to separate one part of the house from another?
5. What use would the people make of the flat roof during:
 - (a) a rain storm?
 - (b) a hot summer evening?
 - (c) harvest time?
6. How is this home different from your home
 - (a) on the inside?
 - (b) on the outside?

the men gather the scattered flocks. Later upon closer inspection of the flocks, it is found that four lambs have disappeared in the storm.

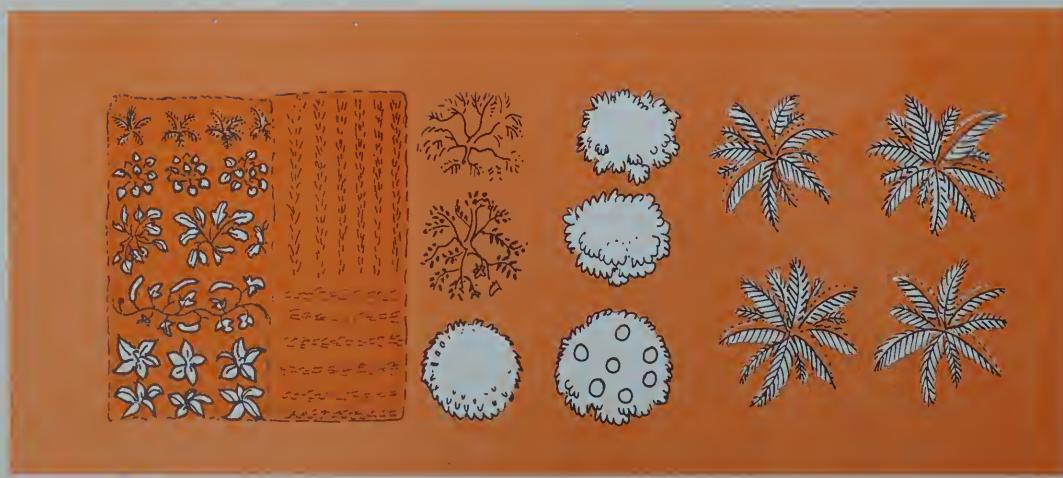
THE GREEN EMERALD

Several days have passed. One morning, Father tells me that we will soon reach the oasis where we will sell some of the sheep and goats. This will be our last night on the sandy desert for a long time.

A few hours after dawn, we arrive at the oasis. It is like a bright garden in the middle of an **arid** wasteland. Tall palm trees, checkerboard areas of crops, mud-brick buildings, and bustling market-place make a great change from the land from which we have come. "Gather the herds, Hamid," Father calls. To get the best price, Father and I, with the other men of our tribe, will choose some of the fat healthy goats and sheep to sell at the market-place. As we leave, Mother and Sarah are busy setting up the camp at the edge of the oasis. Tomorrow we will visit the market-place, but to-night we will celebrate our arrival at the oasis with a feast!



Where water is found below the surface.



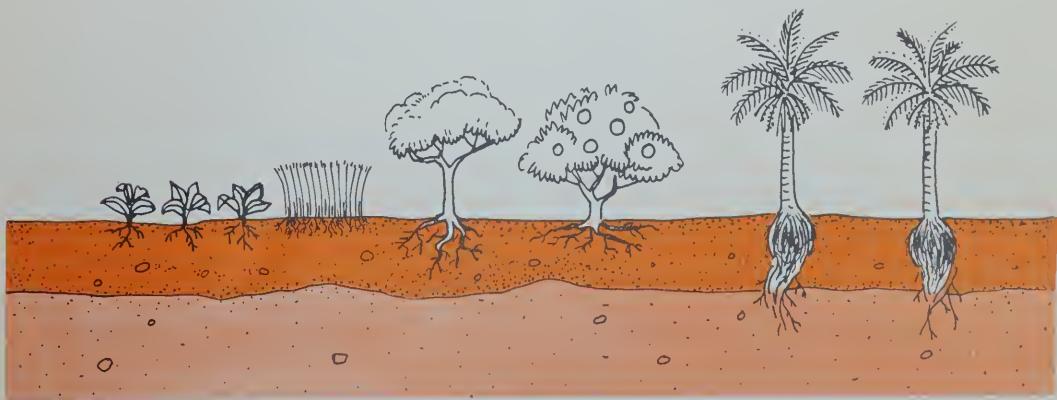
Field pattern of crops on oasis farm.

Water = Life

1. From where do the people get their water?
2. If you needed water, at what point (B, Q, or M) would you dig a well? Why did you choose this point?
3. What are some of the things you would have to know before you begin to dig a well?

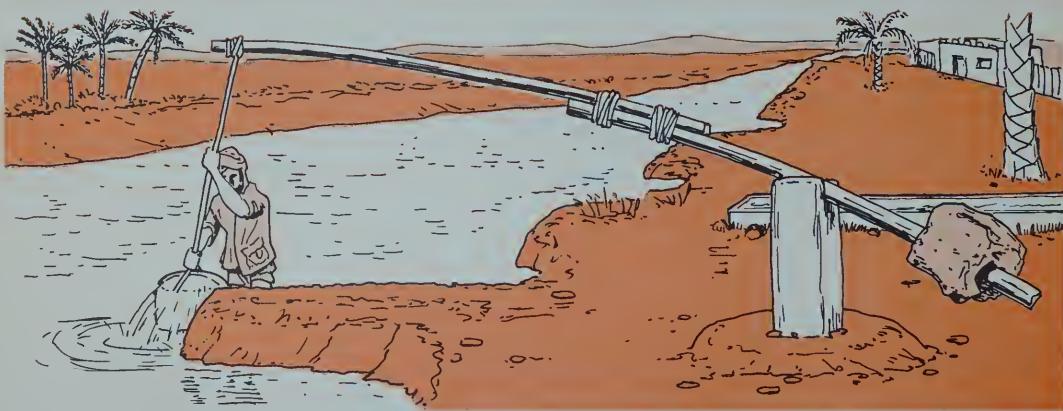
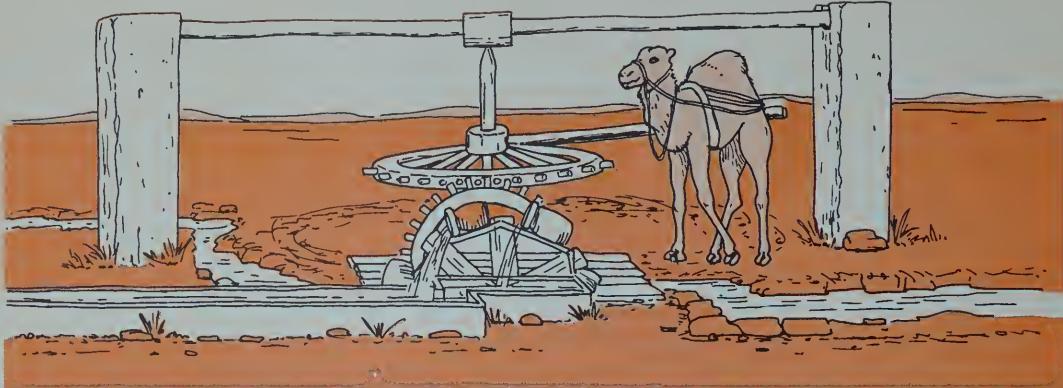
Look carefully at the sketch of the fields planted by the farmers. The pictures below this show the length of the roots of some of the crops they grow.

1. If these fields belonged to you, where would you dig your well to give each of your crops the water they need to grow?
2. Where would you dig the ditches to carry the water to the crops?



Root systems.

Obtaining Irrigation Water



Four ways of raising water: a sakia, a shaduf, a draw well, a modern pump.

These are sketches of ways of raising water from deep in the ground to the surface.

1. Which method of raising water to the surface would you prefer to use as a farmer? Why?
2. Why do some people still use the shaduf or sakia?
3. How has modern technology changed the methods of getting water?

Things To Do

If you go to the beach in the summer, dig a hole in the sand about 20 feet back from the water's edge. Note what happens as the hole is dug deeper. This shows there is a water table below the ground. When people dig wells, this is where the water comes from.

At an Arab picnic each guest dips his food from a tray in the centre.



RIGHT HANDS ONLY

My father has invited our chief to have dinner with us this evening. We start the meal with a bowl of highly-spiced soup. The bowls are lifted to the lips and slurped with very loud sips. A type of sausage made of mutton, flavoured with sage and mint and baked with a thin layer of pastry is then served. It is called **Bourak**. The third course is "laham'lalou" which is a leg of mutton, cooked with sweet almonds and prunes. **Couscous**, a main dish, which is served at all meals, is brought in with the mutton. It is made from cracked wheat which is formed into balls, cooked over steam and popped into the mouth. For dessert, fruit and little cakes made of flour, almond paste and honey are served to make the meal delicious and completely filling. Unlike in most countries, where food is eaten with both hands, we eat our food with the right hand only.

Following the meal, the adults gather together to sing songs and play musical instruments, while the children gather about to wait for Rakhamin, a chief,

MENU OF A MEAL EATEN BY THE PEOPLE OF THE OASIS

Couscous — a stew made of ground wheat, flour, salt, pepper, mutton or chicken, eggs, carrots, potatoes, chick peas, spinach, celery, tomatoes, peppers.

Strong Tea

Sweet Tea

Fruit

Peanuts



The date palm is the
richest possession of the
desert dweller.

AMOUNT OF DATES GROWN



AMOUNT OF DATES
USED BY THE FARMER

WHAT USE IS MADE
OF THE REMAINDER?

Compare the food the nomads eat on the desert with the food they eat at the oasis.

1. What food do they grow themselves?
2. From what parts of the world would the people get the spices and foods they do not grow themselves?
3. How would the people get the food and things they need?
4. How does the farmer pay for the food and things he needs?
5. What meal do you eat at home that is similar to "couscous"?
6. What similarities and differences do you find between the food the people of the oasis eat and the food you eat at home?
7. How are the eating customs of these people different from yours?

who is very old and wise. Slowly the feeble old man settles by the fire. After moving his robes closely about him for extra warmth, he begins to tell us his stories. We listen and the stories become real as we stare, hypnotized by the flames of the roaring fire. When he leaves, the chief wishes us much profit from the sale of our sheep at the market, in the morning

ORDERLY CONFUSION

Next morning, we are up at dawn to go into the oasis. The market-place is a fascinating place to visit. It is crowded with small stalls and people. Everywhere, the people stand or squat and shout and bargain with the merchants. With much excitement, they buy spices, coffee, wool, daggers, tobacco and many other items. Father has left me at the edge of the market-place while he sells the sheep. With the money we will buy many things we need. We must buy a **jarrah**, or water bottle. Ours was broken during the desert trip. Mother will buy many things from the spice merchant, and if there is enough money, Father has said he will buy me new sandals.

The Date Palm Tree

The presence of date palms in the desert is always a sign that water can be obtained by digging wells, for date palms will only grow in a dry desert area if their roots can reach down to the water. The main work of the people of the oasis is the care of these trees which are the most important crop grown in the oasis. The date palm gives them the dates to eat, but, more importantly, the dates are sold for the food they do not grow themselves. It also gives the people timber for building, and leaves for making baskets, mats, shoes, and for stuffing saddles.



A desert market where camels are bought and sold.



The great Mosque
at Medina.

The Market Place



The spice merchant.

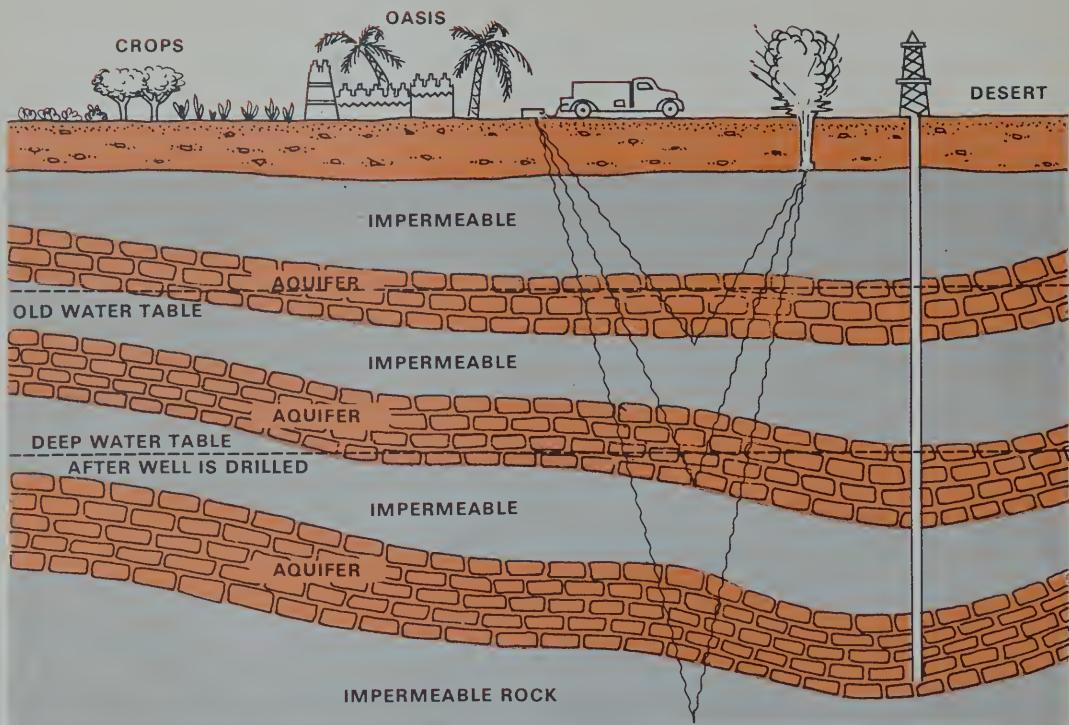
Things To Do

Set up a market like the Arab market-place with your class. Books, toys, etc. could be bargained for at the market. Be sure to bargain for a good price.

The smile on Father's face tells me that he was able to get a good price for the sheep and goats. He gives some money to Mother and Sarah, and they both go to the spice merchant. He sits on the ground in front of a mat covered with small bags of spices. After they have greeted each other warmly, Mother asks, "Have you any cardamon seed?" Smiling, he answers, "You are very lucky today."

"I am the only merchant who has the cardamon seed to sell. No other merchant will risk smuggling spice from another country, but I am brave; I have not yet been caught. How many seeds do you want?" "Forty kernels," replies Mother. "What is the cost?" "Ah-h-h, since you are a friend, I will charge you only forty piasters." "Forty piasters!" cries Mother, "May Allah strike you down; you are a thief: I will pay you twenty piasters." After much yelling and excitement, Mother pays the merchant thirty piasters for the seed. Both she and the merchant are happy when they say farewell; Mother has paid what she felt the seed was worth, and the spice merchant has made a profit.

Water – Underground Wealth of the Desert



Locating aquifers using a seismographic truck.

1. What effect has drilling for oil in the desert had on the water supply of the oasis?
2. How must the people now working in the desert oil fields and the people of the oasis depend upon each other?

Did You Know?

... Education is becoming very important to the people of the Sahara. On some oases, schools operate in three shifts but supplies are very low. A blackboard and pencils are rare and expensive objects. Due to the Moslem attitude towards their women, girls usually are not allowed to go to school, and the ratio of boys to girls is often 100 to 1!

Did You Know?

... Under much of the desert there are great water-bearing rock structures. One such **aquifer** contains more water than the Gulf of Arabia.

All buying and selling is done in this way at the market-place. It is called **bargaining**.

Later that afternoon, before returning to the camp, we go to the **Mosque** to give thanks to Allah for our safe journey through the desert and the profitable sale of our animals. I give special thanks for my new sandals before we leave for our camp.

THE MODERN DESERT

That evening Father and I visit the home of a good friend, Fadhal. Unlike my father, Fadhal works for a large oil company which is located several miles from the oasis. He lives with his family at the oasis, and each day he travels in a big truck to the oil field. "Would you like to come to the oil field with me tomorrow, Hamid?" he asks. I look at my father for a sign of approval. "Praise be to Allah!" Father says yes. Before sunrise, I begin to get ready. When Fadhal is ready to leave, we climb on the large truck. We leave the village, surrounded by palms, those great umbrellas that allow only bits and pieces of sunlight to come

Oil drilling rig.





The oil tank truck carries steel mesh to put under the tires in case the wheels get stuck in the sand.



A sand buggy.

Things To Do

Use your library reference books to discover what it is like on a cold desert, and a wet desert.

Questions Regarding the Sand Buggy

Comment on the size of the tires. Does this remind you of the camel and his large feet? Why is this type of vehicle used? What is it used for? In what part of the desert is it most useful? Why do two sand buggies usually go together on any long journey and why do they equip themselves with long poles on top of which flutter white flags?

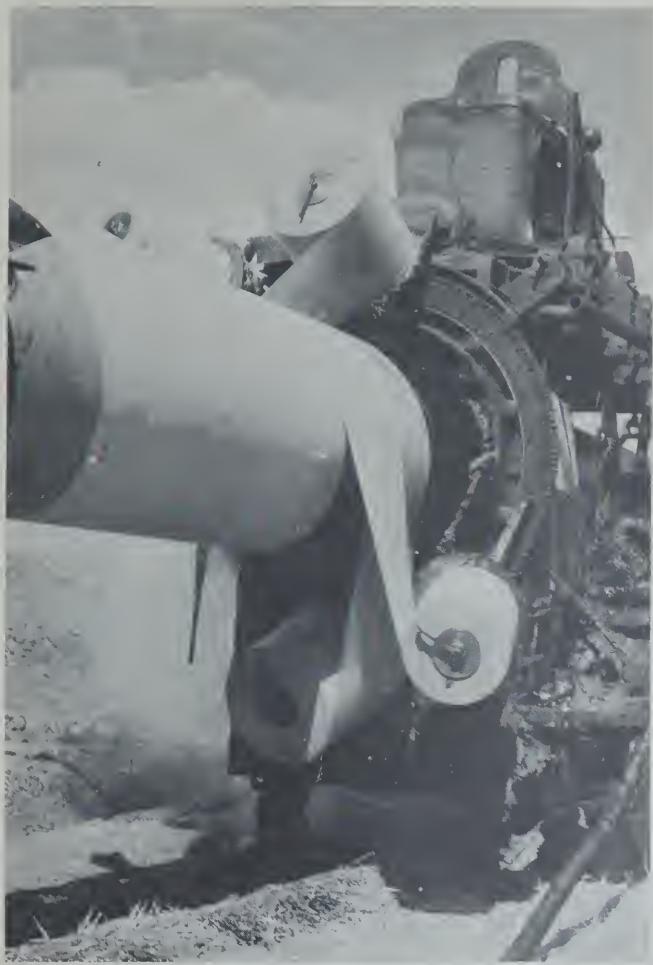
through, and go out into the sandy desert. The temperature is 107°. The tank truck has a square-shaped body, large thick wheels, and a very powerful engine, to move easily over the desert **terrain**. The driver shifts gears often, perhaps once every minute, when we enter the sand. In spite of this, the sand is often too soft, and we can easily get stuck. "What will we do if we sink into the sand?" "We carry long pieces of steel mesh to get us out," Fadhal replies. At that moment, the driver jams on the brakes, knocking us to the floor. "Everyone out of the truck!" he yells. "Why does he stop so suddenly, Fadhal?" "If he doesn't stop before the wheels start to spin, they only dig deep holes, and it is harder to get out," he answers. Fadhal and the driver jump from the truck and take the long pieces of steel mesh from the sides. There are ten pieces of mesh, each about ten feet long. From the front wheels, they lay a fifty foot runway ahead of the truck. In this short distance, the driver has to gain enough speed so that the truck can keep going to harder-packed sand before



A trencher.



The pipeline is 40-42 inches in diameter.



This machine tars and papers the pipes.

Divide your class into groups. Examine the pictures carefully.

What questions come to mind to which you would want answers?

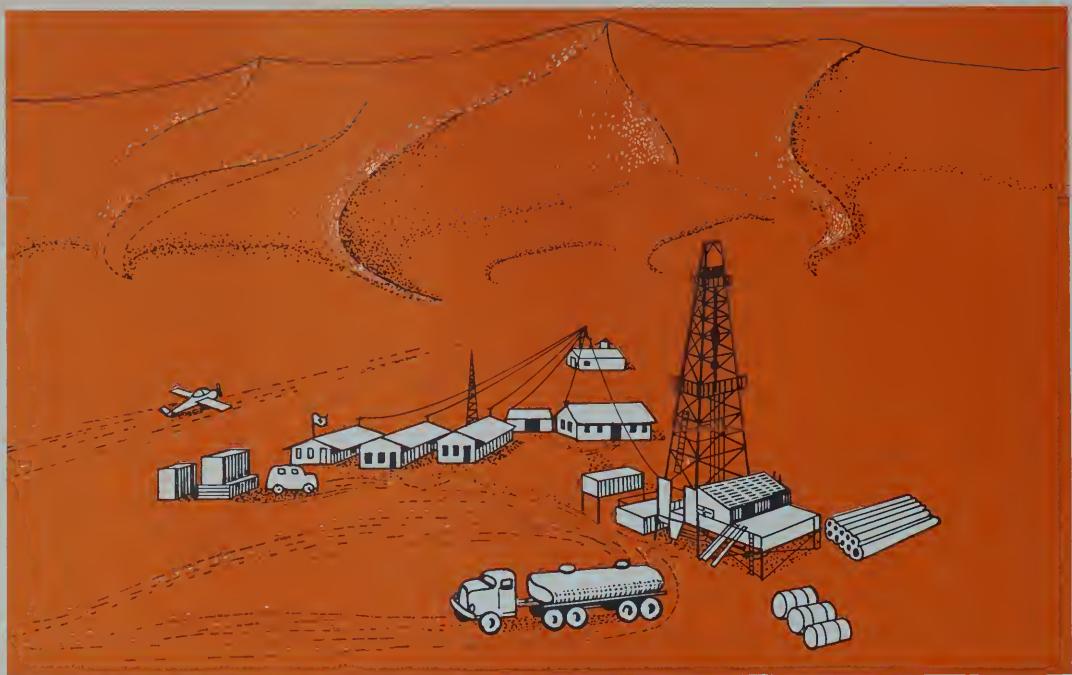
Make a list of your questions. In turn, each group presents their questions to the class to be answered. After this has been done, discuss amongst yourselves the information you have obtained that best explains the operations in the pictures.

we can stop to go back for the steel mesh. When driving on sand, it is wise to keep going fast enough so the wheels don't have time to sink.

Another way of avoiding trouble is to travel in a sand buggy.

While we are waiting for our driver to get us out of the sand trap, we look at the countryside. The few bits of desert brush are ash-grey in colour. The sand is very hot — perhaps 150 or more. In bare feet, you will be burned badly for it is like walking on red-hot coals. Far off in the distance, the shimmering heat from the surface creates a **mirage** lake.

During the stop, the driver says quietly, "Don't move." Then, very slowly, he raises his arm and points out a gazelle. It is an adult, weighing perhaps forty pounds. Its colour blends in so well with the yellow-grey desert that you have to look very carefully to see the animal. "In recent years these animals have almost been wiped out by hunting parties in trucks and cars," our driver says. The animal then streaks off and at once is joined by eight or nine others which we had not



Oil camp.

LUNCH MENU

Appetizer — Vegetable soup
Choice of chilled juice

Entree — 1. Steak and mushrooms
2. Hot hamburger
3. Halibut steak
(above orders are served
with choice of potatoes
and cole slaw.)
4. Spaghetti and meat balls
5. Bourak, laham lalou, and rice
6. Couscous

Dessert — Fresh fruit
Ice cream
Rice pudding

Beverages — Milk, tea, coffee, cold beer,
soft drinks.

What activities would you select from the following list as being reasonable for occurring at such a base camp?

- an adult training center
- a theatre and recreational area
- offices
- sleeping quarters
- a laboratory
- electric generator
- supply depot
- hospital
- repair shops
- radio station

Questions

What does the sketch view of the camp tell you about the work force? In your discussion consider numbers, ages, education, sex, power supply, recreation facilities.

What does the menu tell you about refrigeration, variety of food available, sources of food, reasons for the choice of selection and quality of food being served?

noticed.

Glancing down at the ground, I see some strange tracks in the sand, which look like a series of letter S's. "Beware of that sign, my young friend. It is the sign of a deadly desert snake — the viper."

Fadhal notices a sand buggy approaching and motions it to stop. "This will avoid any further delay and give us an opportunity to ride in a sand buggy," he says.

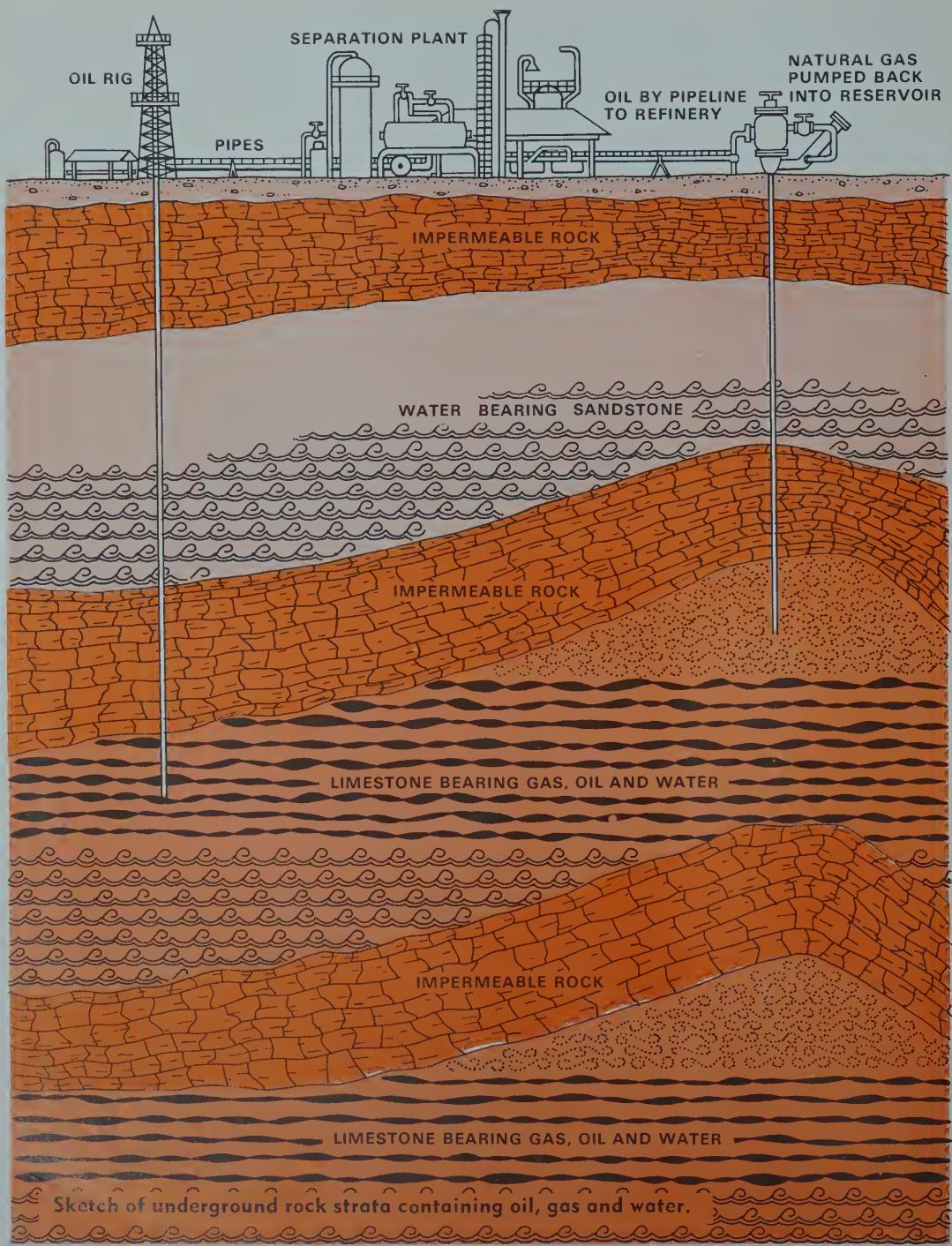
Within minutes, the truck is out of sight as we speed across the desert.

On the way to the oil pumping area, and the exploration camp, the sand buggy passes a work crew. This crew is laying an oil pipeline in a deep trench, so we stop for a short while to find out about the operation.

The sand buggy then leaves this area of shifting golden sands, some of which are piled up into dunes five hundred feet high. I notice that the terrain is changing from sand to a loose stone and rock area, apparently swept free of sand by the wind. I notice also, that the men are laying the pipeline in a manner quite different from what we had seen in the sandy part. As we travel

Things To Do

Phone or write the gas company and inquire how they check for leaks in long underground pipes.



The Oil Field

One of the first things the young Arabs learn about as part of the Training Programme at the camp is the origin of oil and how it is obtained from great depths below the surface.

Questions

Find out what you can about the origin of oil. Do you think that oil, gas and water underground always take the same position with respect to each other as you see them in this sketch? If your answer is yes, explain why — if no, explain why.

What is the purpose of pumping the gas which has been secured from below the ground and has passed through the pumping station back into the ground? Draw a simple flow diagram to indicate your answer.

on Fadhal remarks, "We can reach the oil camp in one-half hour by sand buggy, whereas it would take a whole day for your caravan to cover the same distance."

THE OIL FIELD

The oil field stands alone in the desert. The concrete block and steel towers and buildings appear on the desert almost over-night. The drilling of oil means many new jobs and a better way of life for the people of the desert. The oil companies build schools and hospitals and, very slowly, the life of the desert nomad is changing. Many young men no longer follow the nomadic life of their fathers, but take jobs with the oil companies where they are given, in addition to good pay, an education and an opportunity for advancement.

Upon arrival at the base camp, we are taken to the dining-room for lunch. During lunch, a voice behind me calls, "Hi Hamid, have you seen any vultures lately?" Turning quickly, I realize to my surprise, that it is the two geologists whom I'd discovered near death, months before, on the desert.





Questions: In a desert area, why is there enough water to allow for a swimming pool?

Why is this the exception rather than the rule in an oasis town?

By whom was it built and paid for? How many months of the year would this pool be in use?

"When you have finished your chocolate ice cream, how would you like to join us on a tour of the rest of the camp?" they ask. "That will be fine," Fadhal says. "When you are through, Hamid, I have another surprise for you." When I leave the two geologists after my tour around the camp, I run to find Fadhal.

A RIDE IN A BIRD

"I must check the pipeline. Would you like to go for a ride in the helicopter, Hamid?" Fadhal laughs when he sees the excitement on my face, as we walk to the helicopter. The pilot helps us into our seat and tightens the seat belt around us. With a turn of the ignition key, the huge blades of the plane begin to rotate. Noise fills the air. With eyes as large as saucers, I stare at the pilot. He moves his hands and his feet, and with a graceful motion, we take off. Soon, the trailers which seemed so large look more like tiny toys that are sold in hobby shops. Fadhal and I play a game of naming the tiny buildings below. "There's the dining hall, and over there, that's the repair



SUMMER LIVING AREA

	Year												
Temp. (°F)	72	76	81	80	77	73	72	72	72	73	72	71	74
Rainfall (ins)	0	0	1	2.4	6.4	9.0	12.4	14.7	10.2	6.7	1.3	0	64.1"

WINTER JOURNEY AND DESTINATION

	Year												
Temp. (°F)	55	57	63	70	76	80	82	82	78	74	65	58	70
Rainfall (ins)	.5	.4	.2	.2	0	0	0	0	0	0	.2	.4	1.9"

Nomadic Journey

shop." With a graceful, falling motion, the helicopter swoops over the sand dunes, where, a short time ago, we had been stuck in the truck. "Fadhal, from here, I can see the sand moving across the ground and piling up in high dunes. Look! In the distance, the oasis; see the palm trees, the market-place and over there — our camp. Ah-h-h-h, if Sarah could only see me now." "This is how we transport men and materials from the base camp to the outlying work parties in the desert," the pilot says. "You can see how much easier and quicker it is to fly over the sand and the barren rock than it is to bump over it in a truck, and perhaps get stuck. However, we can carry only materials that are light in weight." Too soon, the ride is over. I will remember this trip to the oil fields forever. When Fadhal finishes his work, he calls me once again to the truck to return to the oasis. How I wish we could return in the helicopter!

Study the sketch map and the pattern of movement from summer home to winter destination.

1. Would you do as a nomad family did and choose to live further south in the summer? Why?
2. Explain why, even with only $\frac{1}{2}$ " rainfall or less in winter months, grass is able to grow in some parts of the desert.
3. How has this fact influenced the nomads way of life in winter?



Fifty people live in this camp. Half are Europeans; half are Arabs. In the middle distance is the water which has been used to cool the drill bit as it penetrates the rock formations.

Behind the camp is a large sand dune.

THE CEMENT POND

As we travel back to the oasis, the sun is nearing the western horizon. It is a welcome sight to see once again the tall shading palms. The truck stops in front of a strange building that I have never seen before. "Six months ago," began Fadhal, "the Oil Company built this swimming pool here for the use of the workers. It is a welcome rest station after a hot day's work on the desert. If you wish, you may join us for a

swim, before you return to your family." Never have I seen such clear blue water, and as I throw myself into the pool, the refreshing cool water wipes all memory of the burning desert out of my mind. We yell and splash each other with water, and only after Fadhal's insistence, do I come out of the pool. I must rush to tell Father, Mother and Sarah about my exciting day at the Oil Company, but I am so tired. Will my legs collapse before I reach home? Perhaps I will tell them tomorrow.



Walking home.

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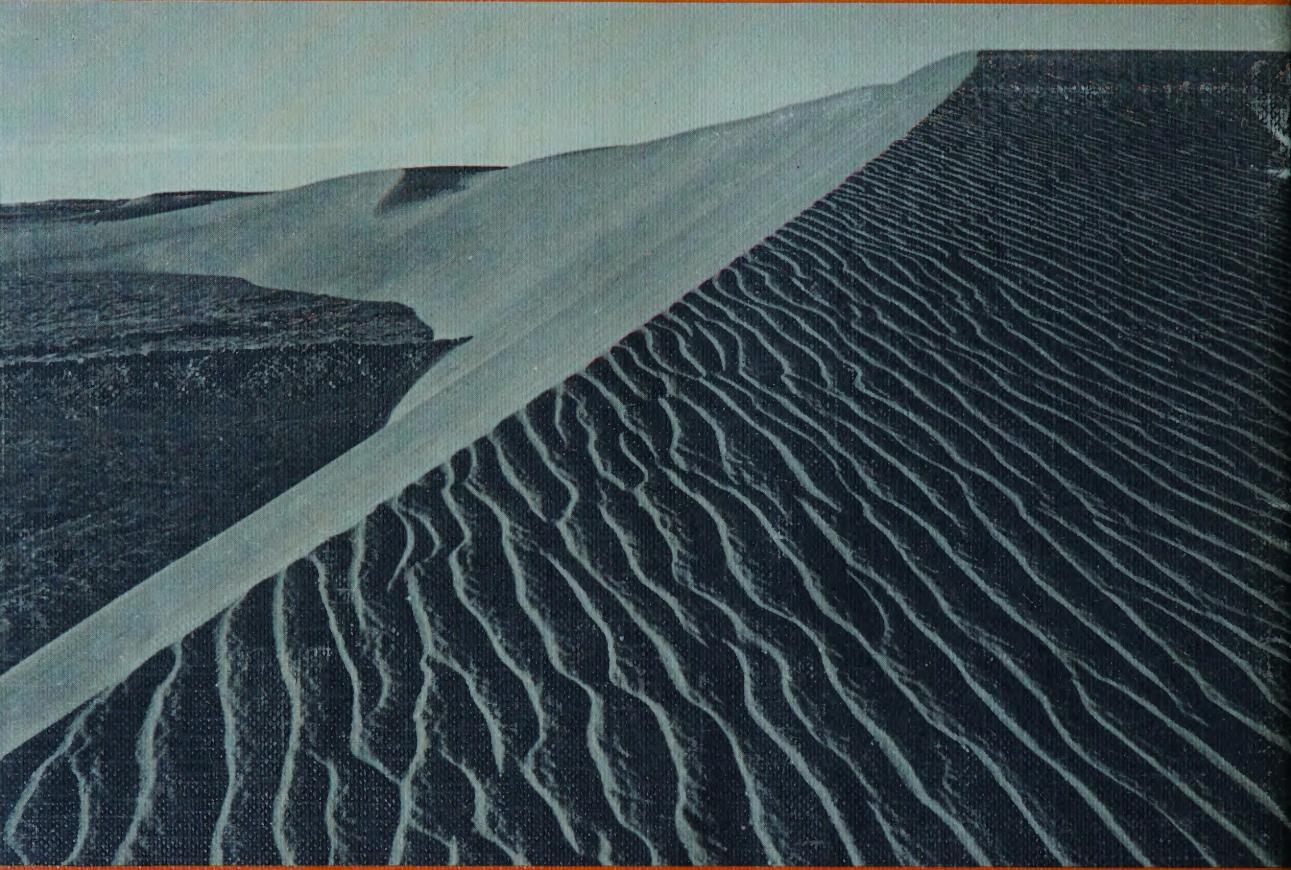
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